

EVALUATION OF A PROTECTIVE FUNGICIDE SPRAY PROGRAM
FOR CONTROL OF JACK PINE GALL RUST AT THE GENERAL ANDREWS NURSERY,
WILLOW RIVER, MINNESOTA

WORK PLAN

By

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INTRODUCTION

The General Andrews State Nursery at Willow River, Minnesota has recently experienced severe jack pine gall rust infection. Minnesota Department of

Natural Resource (DNR) personnel reported 70 percent cull (in several beds), due to obvious galls in the 1982 fall lifted 2-0 stock. As a result of these, and previous years' losses, Forest Pest Management (FPM) was asked to work with DNR Forest Pest Specialists (FPS) and Nursery personnel to develop a spray program to be part of an overall gall rust control program.

Galls typical of both pine-pine (Endocronartium harknessii (J. P. Moore) Y. Hiratsuka) and pine-oak gall rusts (Cronartium quercuum (Berk.) Miy. ex Shirai) were observed on stock. As both diseases occur in the region surrounding the Nursery, it is possible that losses have resulted from infections of one or both fungi.

Fusiform gall rust (Cronartium quercuum (Berk.) Miy. ex Shirai f. sp. fusiforme Byrdsall and Snow) in southern pine nurseries has been successfully controlled with applications of the systemic fungicide, Bayleton (Rowan 1982). Because fusiform and pine-oak gall rusts are caused by the same species (Burdsall and Snow 1977), it is probable that Bayleton will control the latter. Although pine-pine gall rust is caused by a distinctly different fungus, it too has been reported to be controlled with Bayleton applications in Christmas tree plantations (Anon. 1982, McCain personal communication 1983).

A three year evaluation of a Bayleton application program for control of jack pine gall rust will begin in April, 1983.

MATERIALS AND METHODS

Identification

In May, 1983 aeciospores will be collected from 20 galls on jack pine surrounding the nursery beds. Spores will be scraped from the gall surfaces, placed in glass tubes, and kept cool. Aeciospore germ tube elongation will be used to identify the species of fungus causing the galls (Anderson and French 1965) .

Also in 1983, fifty galled, 2-0 jack pine seedlings will be transplanted at the nursery. In spring 1984, these seedlings will be examined for aeciospore production. Galls will be speciated using the technique of Anderson and French (1965).

Chemical Control

A three year Bayleton application program (4 oz/20 gallons/acre) (see Appendix A for label) will begin in 1983. Jack pine 1-0 beds will be sprayed every two weeks during the period mature teliospores are present, May 16 through July 25 (Nighswater and Patton 1965). Portions of the beds will be left unsprayed so that the effectiveness of the spray program can be evaluated (Figure I). A similar spray schedule will be followed in 1984 and 1985, but will include both 1-0 and 2-0 stock. This will result in two, 2-0 crops which have received Bayleton applications during their entire nursery rotation.

In spring 1984 and 1985, 2-0 beds will be evaluated for gall rust infection (presence of galls). A systematic sample starting at a randomly selected position in the bed will be drawn from both the treated and untreated sections of the beds (20 plots x 10 seedlings/plot = 200 seedlings/bed). Seedlings will be graded as galled or not-galled.

Because galls may take a year or more to develop following infection, latent infections may be present in 2-0 stock. To determine the rate of latent infection, galled 2-0 seedlings from both sprayed and non-sprayed areas will be outplanted in spring 1984 and 1985. Seedlings will be evaluated one year following planting for subsequent gall development.

The effectiveness of Bayleton applications for gall rust control will be evaluated by comparing rate of infection in the treated versus non-treated portions of the nursery.

TIME TABLE

<u>Organization</u>	<u>Duty</u>	<u>Date</u>
FPM and Nursery	- Spray plot layout (1-0)	April 1983
FPM and FPS	- Collect and identify aeciospores from windbreaks	May 1983
Nursery	- Fungicide application to 1-0 stock	May-Aug. 1983
FPM and Nursery	- Transplant 2-0 stock	May 1983
FPM	- Progress report	November 1983
FPM and Nursery	- Spray plot layout (1-0 and 2-0)	April 1984

FPM and FPS	- Evaluate transplants	May	1984
Nursery	- Fungicide application (1-0 and 2-0)	May-Aug.	1984
FPM	- Progress report	November	1984
FPM and FPS	- Evaluate 2-0 beds prior to lifting	April	1985
FPM and FPS	- Outplant 2-0 stock	April	1985
Nursery	- Fungicide application (2-0)	May-Aug.	1985
FPM	- Progress report	November	1985
FPM and FPS	- Evaluate 2-0 beds prior to lifting	April	1986
FPM and FPS	- Outplant 2-0 stock	April	1986
FPM and FPS	- Evaluate outplanted 2-0 stock	May	1986
FPM	- Progress report	November	1986
FPM and FPS	- Evaluate 1986 outplanted stock	May	1987
FPM and FPS	- Final report	November	1987

EQUIPMENT

50 ft. tape	Cooler
Flagging	Camera and film
Wire flags	Glass vials
Tatum	Labels
Pens	Planting bags
Planting bar	Sample bags

ESTIMATED COST TO FPM

1983

Per diem	150.00	
GSA vehicle rental and mileage	150.00	
Statistical consultant	<u>25.00</u>	
	\$325.00	\$325.00

1984

Per diem	50.00	
GSA vehicle rental and mileage	<u>100.00</u>	
	\$150.00	\$150.00

1985

Per diem	100.00	
GSA vehicle rental and mileage	<u>100.00</u>	
	\$200.00	\$200.00

1986

Per diem	150.00	
GSA vehicle rental and mileage	<u>150.00</u>	
	\$300.00	\$300.00

1987

Per diem	100.00
GSA vehicle rental and mileage	50.00
Data processing and	100.00
statistical consultant	

	\$250.00
Total estimated cost	\$250.00
	\$1,225.00

LITERATURE CITED

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